

A RETROSPECTIVE ANALYSIS ASSESSING THE FREQUENCY OF ADOLESCENTS WITH PARTIALLY EDENTULOUS ARCH WILLING TO TO UNDERGO ORTHODONTIC CORRECTION BEFORE PROSTHETIC REPLACEMENT

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ABSTRACT

Orthodontic tooth movement prior to prosthetic treatment is necessary for some patients, in order to optimize both esthetic and functional aspects of dental treatment. A patient may require prosthetic orthodontic interdisciplinary treatment when he/she has missing teeth. Orthodontic treatment will help in correcting the tooth alignment such that sufficient space is available for replacement. However, even though various options are available for treatment of missing teeth, patients preference is of utmost importance. The aim of the study is to assess the frequency of adolescents with missing teeth willing to undergo orthodontic correction before prosthetic replacement. It is a university setting study. 322 adolescent patients reporting to the orthodontic department in Saveetha dental college were included in the study. These patients were assessed for missing teeth and their willingness to undergo orthodontic correction. The data was entered in SPSS and analyzed using Chi square test. From the results, it was observed that the majority (54%) of the adolescents with missing teeth were not willing to undergo orthodontic correction before prosthetic replacement. Individuals in the age group of 16 to 20 years (65%) showed more willingness for orthodontic treatment. Also, 58% of the females in the study population were willing for orthodontic correction while only 39% of the males preferred orthodontic correction. Within the limitations of the current study, it can be concluded that the majority of the adolescents with missing teeth were not willing for orthodontic correction before prosthetic replacement. This may be due to increased treatment time required and lack of awareness on the effectiveness of interdisciplinary treatment approach.

Keyword: adolescents; awareness; missing teeth; orthodontic treatment; prosthetic replacement.

INTRODUCTION

The need for orthodontic tooth movement prior to prosthetic treatment is necessary for some patients, in order to optimize both esthetic and functional aspects of dental treatment. (Kokich and Spear, 1997) (Vikram *et al.*, 2017) A notable situation that requires prosthetic orthodontic interdisciplinary

treatment is when a patient requires comprehensive orthodontics treatment to correct tooth alignment in combination with multiple missing teeth.(Sivamurthy and Sundari, 2016) Orthodontic treatment is required to bring out changes in tooth position such that the tooth adjacent to the missing tooth is in a ideal position for replacement(Pinho, Neves and Alves, 2012)(Samantha *et al.*, 2017)(Krishnan, 2015).

Teeth missing may be primarily, due to the agenesis phenomenon, or secondary to extraction.(Jamilian *et al.*, 2018) It complicates decision-making process, since the orthodontist's first vocation is to balance dentofacial pattern with a better cost-benefit ratio, especially in young patients.Moreover, absence of teeth is generally accompanied with other complicated dental and skeletal problems, which affect treatment planning and outcomes(Saber *et al.*, 2018).Permanent first molars are the teeth to be most often missing as they are extracted due to caries.The eruption of these teeth at an early age and its occlusal anatomy is likely to be the reason for them to be more caries susceptible (Mohamed Hussein *et al.*, 2020) and loss of teeth causes occlusal disturbances by pathological migration of neighboring teeth(Felicita, Shantha Sundari and Chandrasekar, 2012).

A thorough communication between the prosthodontics and the orthodontist is essential in order to decide whether space closure or space opening is more appropriate for the final treatment outcomes(Yuksel and Ucem, 1997).Before any prosthetic rehabilitation succeeding space redevelopment, the practitioner has to upright and to parallelize the adjacent teeth in order to gain sufficient space, even apically at the root level.(Thilander, 2008)(Felicita, 2017b)Moreover, the selection of the final prosthetic treatment, is also required at the start of the planning process, to correctly plan spaces between the teeth for future prosthesis.(Jain, 2014)Replacement before or during orthodontics treatment in patients with missing teeth increases the risk of improper prosthesis positioning, which may compromise the esthetic and function of prosthesis.(Rubika, Sumathi Felicita and Sivambiga, 2015)

Orthodontic correction in patients with missing teeth can complicate the therapeutic plan.(Viswanath *et al.*, 2015)The choice must meet the patient's expectations and correct the clinical problem without risking overtreatment, or extending duration care. Several factors guides the therapeutic decision, ranging from the patient's age to economic factors, the technical complexity, therapeutic predictability, and patient comfort, which determine proper compliance and therefore success.(Kamisetty, 2015)

Many studies on outcome of multidisciplinary approach as a clinical study has been conducted but very few studies have been conducted on patients preference and willingness for multidisciplinary treatment modalities.Therefore,this study is conducted to assess the frequencyof adolescents with missing teeth willing to undergo orthodontic correction before prosthetic replacement.

MATERIALS AND METHOD

This is a retrospective study conducted in a university setting (Saveetha dental college and hospitals, Chennai, India). Thus the data available is of patients from the same geographic location and have similar ethnicity. Approval was obtained from the institutional study committee(IEC). The ethical approval number for the present study is SDC/SIHEC/2020/DIASDATA/0619-0320. Two examiners were involved in the study. Population selection was random.Data of patients who reported to Saveetha Dental College from June 2019 to April 2020 were reviewed. The data was entered in the college system in a methodical manner. For the present study, the data of adolescents with missing teeth were reviewed.Clinical examination, orthodontic diagnosis, prosthodontics diagnosis and photographs of these patients were evaluated. A total of 322 case records were reviewed.Cross verification of data for error was done by presence of additional reviewer and by photographic evaluation. Simple random sampling was done to minimize sampling bias.This study was generalized to the south Indian population. After reviewing 322 case records,filtering was done based on data required. The final sample size was 50 adolescent patients with missing teeth.

The data was entered in excel manually and imported to IBM SPSS 20.0 software for analysis. Independent variables included age and gender. Dependent variables included adolescents with missing teeth. Descriptive and inferential statistics were used. Incomplete or censored data was excluded from the study. The frequencies and cross tabulations were performed followed by correlation and association test (Chi Square Test) to check correlation between different variables included in the study. $p < 0.05$ was considered as statistically significant.

RESULTS AND DISCUSSION

In the present study which included 50 patients, 31 were males and 19 were females. Majority (54%) of the adolescents with missing teeth were not willing to undergo orthodontic correction before prosthetic replacement. Individuals in the age group of 16 to 20 years (65%) showed more willingness for orthodontic treatment. Also, 58% of the females in the study population were willing for orthodontic correction while only 39% of the males preferred orthodontic correction.

65% of the individuals who were willing for orthodontic correction belonged to the age group of 16 to 20 years (Figure 1). 35% of those willing for orthodontic correction belonged to 10 to 15 years of age. Chi square test was analysed with P value of 0.914. This depicts that there is no statistically significant ($P > 0.05$) difference between individuals in different age groups to willingness for orthodontic treatment.

54% of the adolescents with missing teeth were not willing for orthodontic correction (Figure 2). Out of which 50% had multiple missing teeth and 50% had single missing tooth. Chi square test was analysed with P value of 0.777. This depicts that there is no statistically significant ($P > 0.05$) difference between adolescents with missing teeth who are willing and not willing for orthodontic treatment.

It was observed that out of 31 males in the study population only 39% of them were willing to undergo orthodontic correction before replacement (Figure 3) and 58% of the females were willing to undergo orthodontic correction. Chi square test was analysed with P value of 0.186. This depicts that there is no statistically significant ($P > 0.05$) difference among males and females and their willingness for orthodontic treatment.

Similar to the present study, Jamilian et al (Jamilian *et al.*, 2018) also reported that teenagers don't prefer orthodontic correction before replacement of missing teeth. Saga AY et al (Saga *et al.*, 2011) observed that space maintenance by orthodontic correction is complicated and least preferred by patients. Authors (Sharma, 2013) (Jamilian *et al.*, 2018) stated that the least preference of orthodontic treatment among individuals could be due to increased treatment time as they have to undergo orthodontic followed by prosthodontic treatment and also high demands of aesthetics by those undergoing treatment. Also, patients felt treatment cost was more as they have to pay for orthodontic and prosthodontic treatment which is why they choose prosthetic replacement directly. (Dinesh and Saravana Dinesh, 2013). In contrast to this study Aghoutan et al reported that patients preferred combined orthodontic prosthetic treatment due to its better long term outcomes. (Aghoutan *et al.*, 2020)

Raveli et al (Raveli *et al.*, 2017) reported that the older age group showed more willingness for orthodontic treatment which was similar to the findings of the present study. Increased preference for orthodontic correction among older population maybe due to less preference of artificial teeth and improved stability of interdisciplinary approach. (Hom and Turley, 1984)

As from the results of this study which showed females had increased willingness for orthodontic correction, Tuominen et al (Tuominen, Nystrom and Tuominen, 1995) and Shaw et (Shaw, O'Brien and Richmond, 1991) also stated that more females opted for orthodontic treatment which may be because they are more dissatisfied about their appearance and dentition in comparison to males. (Kumar *et al.*, 2011)

To choose treatment modalities, especially when various options are present, interactions between dentists and clients are of paramount importance. Accordingly, two factors can influence interactions and decision making to opt for a treatment; first, how individuals awareness of their disease conditions and various types of effective therapies available and second, dentists awareness of expectations and attitudes in patients toward themselves as well as treatments. (Sadat-Marashi, Scolozzi and Antonarakis, 2015)

Space management represents a challenge for orthodontists because of the extended treatment time, the discomfort created for the patient, tissue tolerance, and stability. (Raveli *et al.*, 2017) (Felicita, 2018) However, the successful outcome of treatment when interdisciplinary approach is used is highly significant which is why many dental professionals prefer combined orthodontic prosthetic treatment modalities. (Krishnan, Pandian and Kumar, 2018) (Felicita, 2017a)

This study could pave the way for new research to be done to improve patient's preference of multidisciplinary treatment modalities for effective long term outcome. Limitations of this study includes limited study population and demographics.

CONCLUSION

Within the limitations of the current study, it can be concluded that the majority of the adolescents with missing teeth were not willing for orthodontic correction before prosthetic replacement. This may be due to increased treatment time required and lack of awareness on the effectiveness of interdisciplinary treatment approach.

AUTHORS CONTRIBUTION

First author, Faazila Fathima performed the data collection by reviewing patient records, filtering required data, analysing and interpreting statistics and contributing to manuscript writing.

Second author, Dr. Remmiya Mary Varghese contributed to conception of study title, study design, analysed the collected data, statistics and interpretation and also critically revised the manuscript.

Third author, Dr. Senthil Murugan P participated in the study and revised the manuscript. All the three authors have discussed the results and contributed to the final manuscript.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interests.

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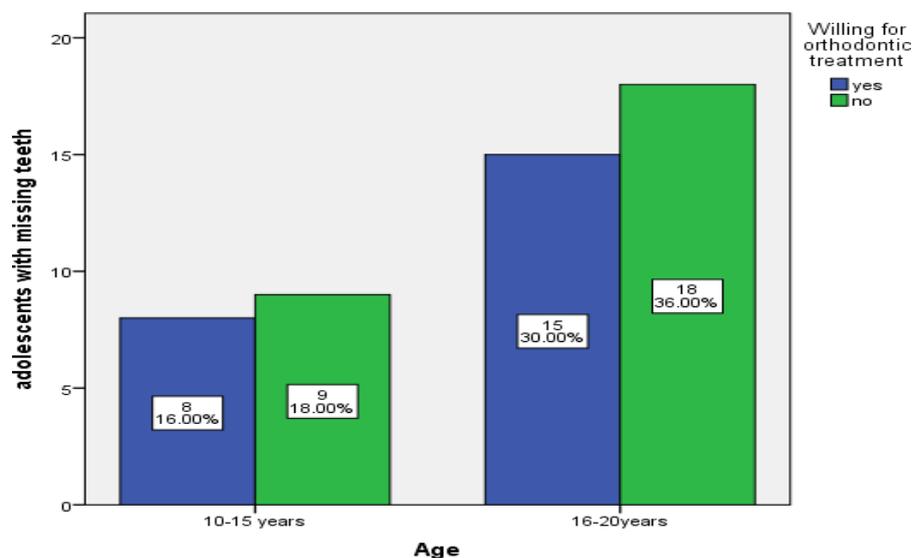


Figure 1: The Bar graph depicts Association of age group and willingness to undergo orthodontic correction before prosthodontic replacement. X axis denotes age group and Y axis denotes the number of adolescents with missing teeth. In the age group of 10-15 years, majority of them were not willing to undergo orthodontic treatment before prosthetic replacement. In 16-20 years age group, majority of them were not willing for orthodontic correction before prosthetic replacement. Chi Square Test with P value of 0.914, hence statistically not significant ($P > 0.05$)

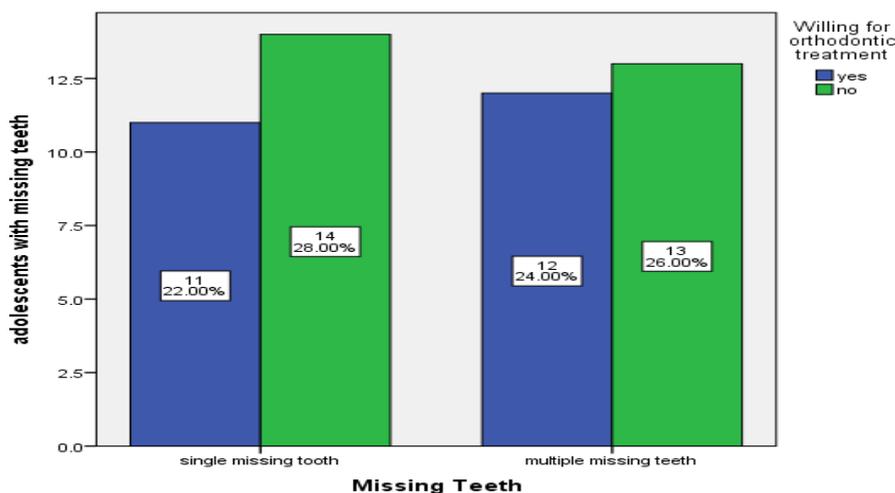


Figure 2: The bar graph depicts the association between adolescents with missing teeth and their willingness to undergo orthodontic correction. X axis denotes the number of missing teeth and Y axis denotes the number of adolescents with missing teeth. This shows that out of total patients with single missing teeth, majority of them were not willing for orthodontic treatment. While, out of the total patients who had multiple missing teeth, majority of them were not willing for orthodontic correction before prosthetic replacement. Chi Square Test with P value was 0.777. Hence, statistically not significant ($P > 0.05$).

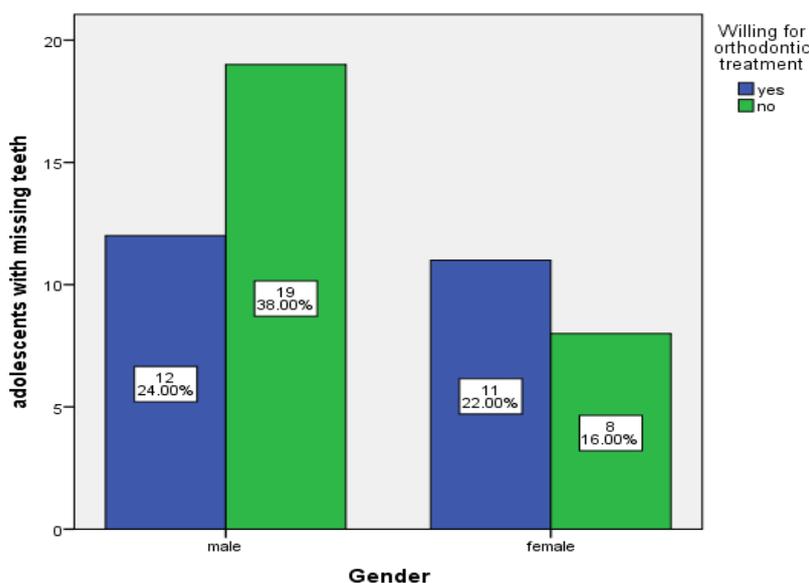


Figure 3: This bar graph depicts the association between gender and prevalence of adolescents with missing teeth willing to undergo orthodontic correction before prosthodontic replacement. X axis denotes gender and Y axis denotes the number of adolescents with missing teeth. This shows that out male patients with missing teeth, majority were not willing for orthodontic treatment and out of the female patients with missing teeth, majority were willing for orthodontic treatment before prosthetic replacement. Chi Square Test with P value of 0.186, hence statistically not significant. ($P > 0.05$)